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EASTERN RESEARCH GROUP, INC.

MEMORANDUM

TO: Jim Eddinger, U.S. Environmental Protection Agency, OAQPS (C439-01)

FROM: Jeanette Alvis and Christy Burlew, Eastern Research Group (ERG), Morrisville

DATE: October, 2002

SUBJECT: Development of the Population Database for the Industrial/Commercial/Institutional Boilers and Process Heaters National Emission Standard for Hazardous Air Pollutants

1.0 INTRODUCTION

This memorandum describes the development of the population database of industrial, commercial, and institutional boilers and process heaters for use in the development of a NESHAP for these sources. This memorandum discusses the sources of data used in the development of the database, the methodology and assumptions applied to compile the different data sources, and the methodology for identifying and removing units which are not included in the source category or will not be affected by this standard. The following is a list of sections within this memorandum:

2.0 SOURCES AND TYPES OF DATA IN THE POPULATION DATABASE

2.1 Data Sources

The boiler portion of the population database was developed using the Industrial Combustion Coordinated Rulemaking (ICCR) Inventory Database version 4.1 and Survey Database version 3.0. The data sources and development of the Inventory Database version 4.1 are described in the memorandum *Development of the ICCR Inventory Database, Version 4.0. and 4.1.*[1] The data sources and development of the Survey Database version 3.0 are described in the memorandum *Data Entry and Quality Assurance Process in the Formation of ICCR Survey Database 3.0.*[2]

An EPA process heater database developed from the ICCR Inventory and Survey databases was used to provide data for the process heater portion of the population database. The development of the EPA process heater database is described in the memorandum *Summary of Database Analysis.*[3]

2.2 Types of Data in the Boiler and Process Heater Population Database

The final population database is a relational database that contains data for 43,225 unique boilers and 15,248 unique indirect-fired process heaters located at 18,584 different major source facilities. Data are grouped into tables according to whether the data are facility-specific, unit-specific, fuel-specific, or control device-specific. Data available on a facility level include facility name, facility description, address information, and other information needed to contact the facility. Unit level data available include capacity, hours of operation, and combustor description (general descriptions as well as design information). Fuel-specific data in the database include fuel/waste type and description, percent annual input of fuel/waste, and whether the fuel/waste is primary, secondary, supplemental, or co-fired. Data available on a control device level include the type of control device, the year a control device was installed, and the manufacturer and model number of a control device. A detailed discussion of tables and data fields in the ICCR Inventory and Survey databases can be found in the memoranda *Description of the ICCR Inventory Database, Versions 4.0 and 4.1*[4] and *Description of Fields in the ICCR Survey Database Version 3.0,*[5] respectively.

3.0 IDENTIFICATION OF DATA AND COMPILATION OF DATA SOURCES

3.1 Identification of Boiler and Process Heater Data

3.1.1 Boiler Data from the Inventory Database

The original Inventory database version 4.1, developed under the ICCR, contains data for boilers, process heaters, incinerators, combustion turbines, landfill gas flares, and reciprocating internal combustion engines. Combustion devices in the Inventory database have one or more Source Classification Codes (SCCs) associated with them. The descriptions which correspond to the SCCs were used to determine which combustion devices in the Inventory database are boilers, so that only records pertaining to boilers would be considered for inclusion in the boiler portion of the population database. Appendix A lists all the SCCs in the Inventory database whose descriptions identify a combustion device as a boiler. The Inventory database also has a "Combustor Description" field which provides some information concerning the unit type. The SCC descriptions were used to distinguish between the various types of combustion devices rather than this field because the SCC field is more standardized and complete than the "Combustor Description" field. There were 70,132 boilers identified in the ICCR Inventory database version 4.1.

3.1.2 Boiler Data from the Survey Database

Under the ICCR, a subset of facilities in the Inventory database identified as having a boiler, process heater, or incinerator that burned any amount of a non-fossil-fuel material, such as wood or sludge, were sent an Information Collection Request (ICR) questionnaire to collect specific data concerning the facilities, their combustion devices, and the types of materials being combusted. Detailed information regarding the development of the ICR questionnaire mailing list from the Inventory database can be found in the memorandum *Development of Mailing List for ICCR Questionnaire.*[6] Approximately 12,000 ICR questionnaires were sent to various facilities during this effort; approximately 10,000 of these facilities responded to the ICR. The responses to the ICR were compiled to create the Survey database.

The questionnaire defined a boiler as "an enclosed device using controlled flame combustion and having the primary purpose of recovering thermal energy in the form of steam or hot water. For the purposes of this survey, only stand-alone boilers are covered by this definition. Waste heat boilers which are associated with stationary gas turbines or engines are excluded." If a facility had a combustion device which met these criteria, the ICR respondent indicated on the survey form that the facility had a boiler. The Survey database includes a "Combustion Device Type" field which was populated based on the device type indicated in the responses. This field was used to identify all the records specific to boilers in the Survey version 3.0 database, for inclusion in the population database. There were 2,945 boilers identified in the ICCR Survey database version 3.0.

3.1.3 Indirect-fired Process Heater Data

The EPA process heater database, which originated from the ICCR Inventory and Survey databases, was created in a similar manner to the boiler portion of the population database. Process heaters were identified in the Inventory database based on the SCC description and in the Survey database based on the "Combustion Device Type" field. In addition, direct-fired process heaters contained in the Inventory and Survey databases were excluded from the EPA process heater database. Further information on the development of the EPA process heater database, including the procedures used to identify direct-fired process heaters, is provided in the memorandum *Summary of Database Analysis*.[3]

One change that was made to the EPA process heater database prior to its inclusion in the process heater portion of the population database was to add approximately 1,470 indirect-fired process heaters from the Inventory database without a specified fuel or for which a solid waste fuel was specified. These had been removed during the development of the EPA process heater database. However, these additional process heaters (representing approximately 10% of the total population of indirect-fired process heaters) were included in the boiler and process heater population to make the database more complete. Process heaters with fuel data that were included in the population database were assumed to be representative of these process heaters without fuel data. Therefore, the distribution of fuel types in the process heater population with fuel data was applied to the process heaters without fuel data.

In addition, the EPA process heater database had been developed using a previous version of the Survey database. Therefore, the final Survey database, version 3.0, was reviewed to determine that 41 additional indirect-fired process heaters needed to be included in the process heater database. A total of 15,720 process heaters from the Inventory portion of the EPA process heater database and 178 process heaters from the Survey portion were included in the population database.

3.2 Compilation of Inventory and Survey Data Sources

3.2.1 Compilation of Boiler Data

Structural differences between the Inventory and Survey databases made it difficult to merge their data. The Survey database has 8 data tables and the Inventory database has 14 data tables. Some data fields that the two databases have in common vary in type, size and structure. For example, the Inventory database has an "SCC Code" field in the "Fuel" table. The description associated with an SCC provides information about a combustion device, such as the fuel type and design type. The Survey database does not contain any SCC data, but rather has a "Material Code" field in its "Materials Combusted" table, which indicates the fuel type. In addition, the design type information is provided in a separate table in the Survey database.

Another issue which prevented the merging of data is the variation of combustion unit identification numbers between the two databases. Boilers described in the Survey database often can not be matched to the boilers initially identified in the Inventory database. For example, a facility which is identified as having three boilers in the original Inventory database, with Combustor IDs P001, P002 and P005, could have returned an ICR survey completed for only two boilers, with Combustion Device ID No's of #2 and #3. Consequently, the two databases could not be merged with only one record retained for each combustion device.

Because the Survey version 3.0 database was constructed from responses to ICR questionnaires that were sent to a subset of facilities that appeared in the Inventory database, some assumptions were made regarding how to incorporate these two databases in creating the boiler portion of the population database. To avoid duplication of boilers, particularly for those boilers burning non-fossil fuels, certain components of each of these two databases were used to

develop the boiler portion of the population database. Sections 3.3.1 and 3.3.2 provide further details concerning the assumptions made to determine these components.

The boiler portion of the population database consists of similar but separate tables for the Inventory database component and the Survey database component. The summation of the boilers included in these two unique components results in the total population of existing boilers for all fuel types.

3.2.2 Compilation of Process Heater Data

Data in the EPA process heater database from the Inventory database could not be combined with process heater data from the Survey database because of the same structural and identification number differences that were encountered during the development of the boiler portion of the population database. Therefore, the process heater portion of the population database also consists of similar but separate tables for the Inventory database component and the Survey database component. The summation of the indirect-fired process heaters included in these two unique components results in the total population of existing indirect-fired process heaters for all fuel types. The boiler and indirect-fired process heater portions of the population database were also kept separate: the Inventory components for boiler and process heaters were not combined and the Survey components for boilers and process heaters were not combined.

3.3 Use of Data Sources to Characterize Boilers and Process Heaters

3.3.1 Data Used to Represent Non-Fossil-Fuel Boilers

Because most boilers in the Inventory database that were identified as burning non-fossil fuels of interest were sent an ICR questionnaire, the database that resulted from these ICR responses (i.e., the Survey database) was assumed to be an accurate and current representation of the existing number and types of most non-fossil-fuel boilers. Therefore, the Survey version 3.0 database was used exclusively to represent boilers burning these non-fossil fuels of interest in the development of the boiler population database. Data from the Inventory database were used to characterize boilers burning fuels that were exempt from the ICR questionnaire (fuels listed in Appendix B). Section 3.3.2 provides further discussion concerning these boilers.

Although ICR questionnaires were sent to all facilities in the Inventory database that were identified as burning non-fossil fuels of interest, a complete response was not received from all of these facilities. EPA conducted a phone survey and performed additional data review of ICR responses to determine the reason for incomplete or unreturned questionnaires. Further information concerning the follow-up phone survey is provided in the memorandum *Industrial Combustion Coordinated Rulemaking Survey Follow-up Contacts for Recipients Who Completed Part I Only.*[7] The follow-up review indicated that those facilities with boilers in the Inventory database that were sent an ICR questionnaire and did not return an entire questionnaire were likely shut down, the boilers were shut down, or the boilers no longer burned these non-fossil materials.

Only data from the Survey database were used in the population database to characterize the boilers covered by the ICR questionnaire, in order to avoid contradicting and double-counting information, as well as to reflect the large number of non-fossil boilers that had been shut down. Consequently, all data for facilities that were required to complete an ICR questionnaire were removed from the Inventory component of the boiler portion of the population database. This accounts for the removal of approximately 5,180 boilers from the population database. However, data from the Inventory database were used to characterize boilers firing some non-fossil fuels, such as bagasse and biogas, because these fuels were exempt from the ICR questionnaire. Therefore, the information in the Inventory database was assumed to be representative of boilers burning non-fossil fuels exempt from the ICR (fuels included in Appendix B).

3.3.2 Data Used to Represent Fossil-Fuel Boilers

The ICR questionnaire exempted facilities that burn only fossil-fuel materials, such as coal, oil, and natural gas, from responding (see Appendix B for a complete list). Consequently, the Inventory database contains the only data available on the numbers and types of these boilers existing. Therefore, the Inventory database was assumed to be representative of fossil-fuel-fired boilers.

3.3.3 Data Used to Represent Process Heaters

During the development of the EPA indirect-fired process heater database, the relatively small number of process heaters included in the ICCR Survey database made it easy to determine

if the ICCR Inventory and Survey databases had any process heaters in common. A few process heaters were identified in both ICCR databases and the duplications were resolved in the development of the EPA process heater database. Further information on the development of the EPA process heater database is provided in the memorandum *Summary of Database Analysis.*[3] The final EPA process heater database includes a field that indicates from which database a given unit originated and therefore, it was not necessary to determine which ICCR database should be used to represent fossil-fuel or non-fossil-fuel process heaters in the population database.

4.0 MODIFICATIONS TO THE POPULATION DATABASE

4.1 Identification of Major and Area Sources

Section 112(a) of the Clean Air Act (CAA) defines a major source as any stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit, considering controls, in the aggregate, 10 tons per year or more of any hazardous air pollutant or 25 tons per year or more of any combination of hazardous air pollutants. The database of industrial, commercial, and institutional boilers and indirect-fired process heaters will only be used to represent units located at major source facilities. Therefore, an analysis was done to identify any area source facilities in the population database. A detailed explanation of this analysis can be found in the memorandum *Identification of Area Sources in the Industrial, Commercial, and Institutional Boilers and Process Heaters Databases.*[8] All facility and unit data were removed from the population database for those sources determined to be area sources. Data for approximately 23,300 boilers and 650 indirect-fired process heaters were removed from the population database based on the area source analysis, leaving approximately 44,600 boilers and 15,250 process heaters at major sources in the population database.

4.2 Identification and Removal of Municipal Waste Combustors

The population database was reviewed to identify units that are municipal waste combustors (MWCs). These types of sources are regulated under the Municipal Waste Combustor Rule and, therefore, any combustion devices which were determined to be MWCs were removed from the population database. This review was done by comparing a list of MWC

facilities considered in the MWC rulemaking to the facilities listed in the population database. Data for facilities which matched were removed from the population database. If it was uncertain as to whether a facility in the population database matched a facility on the MWC list, the data were not removed. Data for approximately 15 boilers were removed from the population database based on the MWC analysis.

4.3 Identification and Removal of Electric Utility Boilers

Because utilities do not fall within the scope of the NESHAP for industrial, commercial, and institutional boilers and indirect-fired process heaters, many utility boilers were removed previously from the ICCR Inventory database during the creation of version 3.0. Further review of the population database was done during its development to identify and remove any remaining electric utility boilers. Facilities in the Inventory component of the boiler portion of the population database were compared with a list of facilities that report under the Title IV Acid Gas Program and also with a list of facilities in the EPA Utility HAP Study to determine which facilities were electric utilities and should be removed. Because utilities burn primarily fossil fuels, only the Inventory portion of the population database was reviewed to identify utility units. Approximately 260 boilers were removed from the population database because they were identified as electric utility boilers. As with the MWC review, if it was uncertain as to whether a facility in the population database matched a facility on one of these two lists, the data were not removed.

4.4 Changes Based on Review of the Boiler and Process Heater Population Database

The initial boiler and indirect-fired process heater population database that was created by combining the appropriate components of the Inventory version 4.1 and Survey version 3.0 databases, and by removing area sources, MWCs, and utilities, was further reviewed to identify any additional changes necessary to ensure its quality and representativeness. This review indicated that some of the fossil-fuel data from the Inventory portion of the database might be outdated. In order to determine the significance of this problem, the total estimated energy consumption by fossil-fuel boilers in the population database was compared to the most current Department of Energy (DOE) energy consumption information available, as reported in the 1994 DOE Manufacturing Fuel Consumption Report.[9] Table A9, Part 2 of this report is included as

Appendix C to this memorandum. This comparison determined that the Inventory portion of the population database contained more boilers burning certain fuel types than were indicated in the more current DOE information. Therefore, the data in the population database were reviewed to identify boilers that potentially should not be included. This review focused particularly on hours of operation, facility descriptions, and on the "Combustor Description" field in the Inventory component of the boiler database. During this review process, the assumption was made that the "Combustor Description" text field contains the most accurate, specific information available for boilers because it contains descriptive information provided directly from the facility. This assumption is consistent with assumptions made during the development of the Inventory version 4.1 database.

One focus of the review was to identify boilers that are no longer operating. This was identified as a possible issue because inventories such as AIRS and OTAG (on which the population database is partially based) may be updated periodically to reflect that units and facilities have been shut down, but the facilities or units may remain in the inventories. The "Operating Status" field in the Inventory component of the population database contains a one-character code that originated from the AIRS database which indicates the operational condition of a facility. Facilities that were identified as being "permanently closed" and the units located at those facilities were removed from the population database. This review of the "Operating Status" field indicated that approximately 140 facilities were no longer in operation. This resulted in the removal of approximately 310 boilers from the population database. In addition, review of the "Combustor Description" field in the Inventory component and comment fields in the Survey component of the population database determined that approximately 10 boilers had been dismantled or were otherwise out-of-operation. These boilers were also removed from the population database. The facilities at which these boilers were located were not removed from the population database unless the out-of-operation boiler was the only boiler at the facility.

Review of combustor descriptions also indicated that a number of units are used only as standby boilers. The review revealed boilers described as emergency, auxiliary, standby, or back-up in the "Combustor Description" field. Additionally, the "Hours of Operation" field in the Inventory component of the population database was reviewed to determine boilers that are standby boilers based on the number of hours operated per year. Because comparison to DOE energy consumption indicated that the population database is over-representing the number of

large boilers that burn solid or liquid fuels, boilers in this subset of the database that are considered to be standby boilers were removed from the population. In addition, these boilers were removed only if the database contained information on at least one other boiler at the facility. This resulted in the removal of approximately 525 boilers.

Review of the "Combustor Description" field in the Inventory component of the population database indicated that the database contained combustion units that are recovery boilers. Because recovery boilers are covered by the Kraft Recovery Boiler MACT and are therefore not included in this source category, approximately 30 units indicated to be recovery boilers were removed from the population database.

Review of the "Combustor Description" field in the Inventory component of the population database also revealed a discrepancy in combustion device type between the description and the SCC description for some units. The combustor description was assumed to be more accurate than the SCC description because the text description is information specifically from the facility. These units were removed from the population database only if their combustor descriptions obviously did not pertain to boilers, such as a combustor description of "incinerator." Approximately 220 units were removed from the population database on this basis.

During the development of the EPA indirect-fired process heater database, direct-fired heaters in the ICCR Inventory and Survey databases were identified and were not included in the final EPA database. In addition, combustion units misclassified as process heaters, process heaters subject to another NESHAP, and heaters which are no longer operating were identified and removed from the EPA process heater database. Therefore, these types of issues were not reviewed for indirect-fired process heaters included in the population database. Further information on the development of the EPA process heater database is provided in the memorandum *Summary of Database Analysis.*[3]

4.5 Changes Based on Additional Stakeholder Comments

Additional changes to the original Inventory database for bagasse boilers were submitted to EPA and were implemented in the population database. These comments were based on ICCR stakeholder review of version 4.1 of the Inventory database. Three bagasse-fired facilities (and their approximate 20 boilers) were deleted because they were identified as duplicates of three

other facilities in the Inventory database. In addition, approximately five bagasse-fired boilers were added to the population database that had not been included in previous versions of the Inventory database.

5.0 RESULTS

The final database of industrial, commercial, and institutional boilers and indirect-fired process heaters located at major sources contains 12 data tables specific to boilers and 13 data tables specific to indirect-fired process heaters from the Inventory database, and 7 data tables specific to boilers and 7 data tables specific to indirect-fired process heaters from the Survey database. The summation of units from these four components represents the entire population of industrial, commercial, and institutional boilers and indirect-fired process heaters. A summary of the number of units from the initial data sources, number of units affected by all changes made, and the final number of units in this database is included in Table 5-1. The complete population database of major sources is contained in boiler docket item II-B-2 in a CD-ROM.

Table 5-1

Summary Table of Boilers and Process Heaters

Description	Section	Approximate Number of:	
		Boilers	Process Heaters
Original Data Sources	3.1	73,080	15,900
Inventory Boilers Required to Complete ICR	3.3.1	-5,180	---
Area Sources	4.1	-23,300	-650
Municipal Waste Combustors	4.2	-15	---
Electric Utility Boilers	4.3	-260	---
Permanently Out of Use	4.4	-310	---
Standby Boilers	4.4	-525	---
Kraft Recovery Boilers	4.4	-30	---
Not a Boiler	4.4	-220	---
Stakeholder Review	4.5	-15 (-20,+5)	---
Final Population Database	2.2	43,225	15,250

6.0 REFERENCES

1. Stephanie Finn and Jason Huckaby, ERG. Memorandum to Fred Porter, Bill Maxwell, and Jim Eddinger, EPA/ESD/CG. *Development of the ICCR Inventory Database, Versions 4.0 and 4.1.* September 9, 1999.

2. Stephanie Finn and Linda Fuller, ERG. Memorandum to Fred Porter and Jim Eddinger, U.S. Environmental Protection Agency. *Data Entry and Quality Assurance Process in the Formation of ICCR Survey Database 3.0.* September 13, 1999.

3. Mary Lalley and Jason Huckaby. Memorandum to Bill Maxwell, U.S. Environmental Protection Agency. *Summary of Database Analysis.* January 18, 1999.

4. Jeanette Alvis, ERG. Memorandum to Bill Maxwell and Fred Porter, U.S. Environmental Protection Agency, OAQPS. *Description of the ICCR Inventory Database , Versions 4.0 and 4.1.* September 3, 1999.

5. David Rhodes, ERG. Memorandum to Fred Porter and Jim Eddinger, U.S. Environmental Protection Agency. *Description of Fields in the ICCR Survey Database Version 3.0.* September 8, 1999.

6. Stephanie Finn, ERG. Memorandum to Fred Porter and Jim Eddinger, U.S. Environmental Protection Agency. *Development of Mailing List for ICCR Questionnaire.* September 7, 1999.

7. Mary Lalley, ERG. Memorandum to Jim Eddinger and Fred Porter, U.S. Environmental Protection Agency. *Industrial Combustion Coordinated Rulemaking Survey Follow-up Contacts for Recipients Who Completed Part I Only.* August 17, 1999.

8. Christy Burlew, ERG. Memorandum to Jim Eddinger, U.S Environmental Protection Agency, OAQPS. *Identification of Area Sources in the Industrial, Commercial, and Institutional Boilers and Process Heaters Databases.* October, 2002.

9. Manufacturing Consumption of Energy 1994. DOE/EIA-0512(94). Energy Information Administration, Office of Energy Markets and End Use. U.S. Department of Energy. Washington, DC. December 1997. http://www.eia.doe.gov/emeu/mecs/mecs94/consumption/mecs4a.html

Appendix A

Source Classification Codes (SCCs) for Boilers

(See Excel spreadsheet "PopmemappA-SCCs.xls")

Source Classification Codes (SCCs) for Boilers

SCC Code	Unit Type	Description
10200203		External Combustion Boilers, Industrial, Bituminous/Subbituminous Coal, Cyclone Furnace
10200204		External Combustion Boilers, Industrial, Bituminous/Subbituminous Coal, Spreader Stoker
10200205		External Combustion Boilers, Industrial, Bituminous/Subbituminous Coal, Overfeed Stoker
10200206		External Combustion Boilers, Industrial, Bituminous/Subbituminous Coal, Underfeed Stoker
10200210		External Combustion Boilers, Industrial, Bituminous/Subbituminous Coal, Overfeed Stoker **
10200212		External Combustion Boilers, Industrial, Bituminous/Subbituminous Coal, Pulverized Coal: Dry Bottom (Tangential)
10200213		External Combustion Boilers, Industrial, Bituminous/Subbituminous Coal, Wet Slurry
10200217		External Combustion Boilers, Industrial, Bituminous/Subbituminous Coal, Atmospheric Fluidized Bed Combustion: Bubbling Bed (Bituminous Coal)
10200218		External Combustion Boilers, Industrial, Bituminous/Subbituminous Coal, Atmospheric Fluidized Bed Combustion: Circulating Bed (Bitum. Coal)
10200219		External Combustion Boilers, Industrial, Bituminous/Subbituminous Coal, Cogeneration
10200221		External Combustion Boilers, Industrial, Bituminous/Subbituminous Coal, Pulverized Coal: Wet Bottom (Subbituminous Coal)
10200222		External Combustion Boilers, Industrial, Bituminous/Subbituminous Coal, Pulverized Coal: Dry Bottom (Subbituminous Coal)
10200223		External Combustion Boilers, Industrial, Bituminous/Subbituminous Coal, Cyclone Furnace (Subbituminous Coal)
10200224		External Combustion Boilers, Industrial, Bituminous/Subbituminous Coal, Spreader Stoker (Subbituminous Coal)
10200225		External Combustion Boilers, Industrial, Bituminous/Subbituminous Coal, Traveling Grate (Overfeed) Stoker (Subbituminous Coal)
10200226		External Combustion Boilers, Industrial, Bituminous/Subbituminous Coal, Pulverized Coal: Dry Bottom Tangential (Subbituminous Coal)
10200229		External Combustion Boilers, Industrial, Bituminous/Subbituminous Coal, Cogeneration (Subbituminous Coal)
10200301		External Combustion Boilers, Industrial, Lignite, Pulverized Coal
10200302		External Combustion Boilers, Industrial, Lignite, Pulverized Coal: Tangential Firing
10200303		External Combustion Boilers, Industrial, Lignite, Cyclone Furnace
10200304		External Combustion Boilers, Industrial, Lignite, Traveling Grate (Overfeed) Stoker
10200306		External Combustion Boilers, Industrial, Lignite, Spreader Stoker
10200307		External Combustion Boilers, Industrial, Lignite, Cogeneration
10200401		External Combustion Boilers, Industrial, Residual Oil, Grade 6 Oil
10200402	External Co	10-100 Million Btu/hr
10200403	External Co	< 10 Million Btu/hr
10200404		External Combustion Boilers, Industrial, Residual Oil, Grade 5 Oil
10200405		External Combustion Boilers, Industrial, Residual Oil, Cogeneration
10200501		External Combustion Boilers, Industrial, Distillate Oil, Grades 1 and 2 Oil
10200502	External Co	10-100 Million Btu/hr
10100902		External Combustion Boilers, Electric Generation, Wood/Bark Waste, Wood/Bark Fired Boiler
10100903		External Combustion Boilers, Electric Generation, Wood/Bark Waste, Wood-fired Boiler
10101001		External Combustion Boilers, Electric Generation, Liquified Petroleum Gas (LPG), Butane
10101002		External Combustion Boilers, Electric Generation, Liquified Petroleum Gas (LPG), Propane
10101003		External Combustion Boilers, Electric Generation, Liquified Petroleum Gas (LPG), Butane/Propane Mixture: Specify Percent Butane in Comments
10101101		External Combustion Boilers, Electric Generation, Bagasse, All Boiler Sizes
10101201		External Combustion Boilers, Electric Generation, Solid Waste, Specify Waste Material in Comments
10101202		External Combustion Boilers, Electric Generation, Solid Waste, Refuse Derived Fuel
10101301		External Combustion Boilers, Electric Generation, Liquid Waste, Specify Waste Material in Comments

Source Classification Codes (SCCs) for Boilers

SCC Code	Unit Type	Description
10101302		External Combustion Boilers, Electric Generation, Liquid Waste, Waste Oil
10200101		External Combustion Boilers, Industrial, Anthracite Coal, Pulverized Coal
10200104		External Combustion Boilers, Industrial, Anthracite Coal, Traveling Grate (Overfeed) Stoker
10200107		External Combustion Boilers, Industrial, Anthracite Coal, Hand-fired
10200201		External Combustion Boilers, Industrial, Bituminous/Subbituminous Coal, Pulverized Coal: Wet Bottom
10200202		External Combustion Boilers, Industrial, Bituminous/Subbituminous Coal, Pulverized Coal: Dry Bottom
10100101		External Combustion Boilers, Electric Generation, Anthracite Coal, Pulverized Coal
10100102		External Combustion Boilers, Electric Generation, Anthracite Coal, Traveling Grate (Overfeed) Stoker
10100201		External Combustion Boilers, Electric Generation, Bituminous/Subbituminous Coal, Pulverized Coal. Wet Bottom (Bituminous Coal)
10100202		External Combustion Boilers, Electric Generation, Bituminous/Subbituminous Coal, Pulverized Coal: Dry Bottom (Bituminous Coal)
10100203		External Combustion Boilers, Electric Generation, Bituminous/Subbituminous Coal, Cyclone Furnace (Bituminous Coal)
10100204		External Combustion Boilers, Electric Generation, Bituminous/Subbituminous Coal, Spreader Stoker (Bituminous Coal)
10100205		External Combustion Boilers, Electric Generation, Bituminous/Subbituminous Coal, Traveling Grate (Overfeed) Stoker (Bituminous Coal)
10100212		External Combustion Boilers, Electric Generation, Bituminous/Subbituminous Coal, Pulverized Coal: Dry Bottom (Tangential) (Bituminous Coal)
10100217		External Combustion Boilers, Electric Generation, Bituminous/Subbituminous Coal, Atmospheric Fluidized Bed Combustion: Bubbling Bed (Bituminous Coal)
10100218		External Combustion Boilers, Electric Generation, Bituminous/Subbituminous Coal, Atmospheric Fluidized Bed Combustion: Circulating Bed (Bitum. Coal)
10100221		External Combustion Boilers, Electric Generation, Bituminous/Subbituminous Coal, Pulverized Coal. Wet Bottom (Subbituminous Coal)
10100222		External Combustion Boilers, Electric Generation, Bituminous/Subbituminous Coal, Pulverized Coal: Dry Bottom (Subbituminous Coal)
10100223		External Combustion Boilers, Electric Generation, Bituminous/Subbituminous Coal, Cyclone Furnace (Subbituminous Coal)
10100224		External Combustion Boilers, Electric Generation, Bituminous/Subbituminous Coal, Spreader Stoker (Subbituminous Coal)
10100225		External Combustion Boilers, Electric Generation, Bituminous/Subbituminous Coal, Traveling Grate (Overfeed) Stoker (Subbituminous Coal)
10100226		External Combustion Boilers, Electric Generation, Bituminous/Subbituminous Coal, Pulverized Coal: Dry Bottom Tangential (Subbituminous Coal)
10100238		External Combustion Boilers, Electric Generation, Bituminous/Subbituminous Coal, Atmospheric Fluidized Bed Combustion - Circulating Bed (subbitum coal)
10100301		External Combustion Boilers, Electric Generation, Lignite, Pulverized Coal
10100302		External Combustion Boilers, Electric Generation, Lignite, Pulverized Coal: Tangential Firing
10100303		External Combustion Boilers, Electric Generation, Lignite, Cyclone Furnace
10100304		External Combustion Boilers, Electric Generation, Lignite, Traveling Grate (Overfeed) Stoker
10100306		External Combustion Boilers, Electric Generation, Lignite, Spreader Stoker
10100316		External Combustion Boilers, Electric Generation, Lignite, Atmospheric Fluidized Bed ** (See 101003-17 & -18)
10100317		External Combustion Boilers, Electric Generation, Lignite, Atmospheric Fluidized Bed Combustion - Bubbling Bed
10100318		External Combustion Boilers, Electric Generation, Lignite, Atmospheric Fluidized Bed Combustion - Circulating Bed
10100401		External Combustion Boilers, Electric Generation, Residual Oil, Grade 6 Oil: Normal Firing
10100404		External Combustion Boilers, Electric Generation, Residual Oil, Grade 6 Oil: Tangential Firing
10100405		External Combustion Boilers, Electric Generation, Residual Oil, Grade 5 Oil: Normal Firing
10100406		External Combustion Boilers, Electric Generation, Residual Oil, Grade 5 Oil: Tangential Firing
10100501		External Combustion Boilers, Electric Generation, Distillate Oil, Grades 1 and 2 Oil
10100504		External Combustion Boilers, Electric Generation, Distillate Oil, Grade 4 Oil: Normal Firing
10100505		External Combustion Boilers, Electric Generation, Distillate Oil, Grade 4 Oil: Tangential Firing
10100601	External Co	> 100 Million Btu/hr

Source Classification Codes (SCCs) for Boilers

SCC Code	Unit Type	Description
10100602	External Co	< 100 Million Btu/hr
10100604		External Combustion Boilers, Electric Generation, Natural Gas, Tangentially Fired Units
10100701	External Co	> 100 Million Btu/hr
10100702	External Co	< 100 Million Btu/hr
10100801		External Combustion Boilers, Electric Generation, Coke, All Boiler Sizes
10100901		External Combustion Boilers, Electric Generation, Wood/Bark Waste, Bark-fired Boiler
10200503	External Co	< 10 Million Btu/hr
10200504		External Combustion Boilers, Industrial, Distillate Oil, Grade 4 Oil
10200505		External Combustion Boilers, Industrial, Distillate Oil, Cogeneration
10200601	External Co	> 100 Million Btu/hr
10200602	External Co	10-100 Million Btu/hr
10200603	External Co	< 10 Million Btu/hr
10200604		External Combustion Boilers, Industrial, Natural Gas, Cogeneration
10200701		External Combustion Boilers, Industrial, Process Gas, Petroleum Refinery Gas
10200704		External Combustion Boilers, Industrial, Process Gas, Blast Furnace Gas
10200707		External Combustion Boilers, Industrial, Process Gas, Coke Oven Gas
10200710		External Combustion Boilers, Industrial, Process Gas, Cogeneration
10200799		External Combustion Boilers, Industrial, Process Gas, Other: Specify in Comments
10200802		External Combustion Boilers, Industrial, Coke, All Boiler Sizes
10200804		External Combustion Boilers, Industrial, Coke, Cogeneration
10200901	External Co	> 50,000 Lb Steam
10200902	External Co	> 50,000 Lb Steam
10200903	External Co	> 50,000 Lb Steam
10200904	External Co	> 50,000 Lb Steam
10200905	External Co	> 50,000 Lb Steam
10200906	External Co	> 50,000 Lb Steam
10200907		External Combustion Boilers, Industrial, Wood/Bark Waste, Wood Cogeneration
10201001		External Combustion Boilers, Industrial, Liquified Petroleum Gas (LPG), Butane
10201002		External Combustion Boilers, Industrial, Liquified Petroleum Gas (LPG), Propane
10201003		External Combustion Boilers, Industrial, Liquified Petroleum Gas (LPG), Butane/Propane Mixture: Specify Percent Butane in Comments
10201101		External Combustion Boilers, Industrial, Bagasse, All Boiler Sizes
10201201		External Combustion Boilers, Industrial, Solid Waste, Specify Waste Material in Comments
10201202		External Combustion Boilers, Industrial, Solid Waste, Refuse Derived Fuel
10201301		External Combustion Boilers, Industrial, Solid Waste, Specify Waste Material in Comments
10201302		External Combustion Boilers, Industrial, Solid Waste, Waste Oil
10201401		External Combustion Boilers, Industrial, Liquid Waste, Natural Gas
10201402		External Combustion Boilers, Industrial, CO Boiler, Process Gas
10201403		External Combustion Boilers, Industrial, CO Boiler, Distillate Oil
10201404		External Combustion Boilers, Industrial, CO Boiler, Residual Oil

Source Classification Codes (SCCs) for Boilers

SCC Code	Unit Type	Description
10201601	External Combustion Boilers, Industrial, Methanol, Industrial Boiler	
10201701	External Combustion Boilers, Industrial, Gasoline, Industrial Boiler	
10300101	External Combustion Boilers, Commercial/Industrial, Anthracite Coal, Pulverized Coal	
10300102	External Combustion Boilers, Commercial/Industrial, Anthracite Coal, Traveling Grate (Overfeed) Stoker	
10300103	External Combustion Boilers, Commercial/Industrial, Anthracite Coal, Hand-fired	
10300203	External Combustion Boilers, Commercial/Industrial, Bituminous/Subbituminous Coal, Cyclone Furnace (Bituminous Coal)	
10300205	External Combustion Boilers, Commercial/Industrial, Bituminous/Subbituminous Coal, Pulverized Coal: Wet Bottom (Bituminous Coal)	
10300206	External Combustion Boilers, Commercial/Industrial, Bituminous/Subbituminous Coal, Pulverized Coal: Dry Bottom (Bituminous Coal)	
10300207	External Combustion Boilers, Commercial/Industrial, Bituminous/Subbituminous Coal, Overfeed Stoker (Bituminous Coal)	
10300208	External Combustion Boilers, Commercial/Industrial, Bituminous/Subbituminous Coal, Underfeed Stoker (Bituminous Coal)	
10300209	External Combustion Boilers, Commercial/Industrial, Bituminous/Subbituminous Coal, Spreader Stoker (Bituminous Coal)	
10300211	External Combustion Boilers, Commercial/Industrial, Bituminous/Subbituminous Coal, Overfeed Stoker **	
10300214	External Combustion Boilers, Commercial/Industrial, Bituminous/Subbituminous Coal, Hand-fired (Bituminous Coal)	
10300216	External Combustion Boilers, Commercial/Industrial, Bituminous/Subbituminous Coal, Pulverized Coal: Dry Bottom (Tangential) (Bituminous Coal)	
10300217	External Combustion Boilers, Commercial/Industrial, Bituminous/Subbituminous Coal, Atmospheric Fluidized Bed Combustion: Bubbling Bed (Bituminous Coal)	
10300218	External Combustion Boilers, Commercial/Industrial, Bituminous/Subbituminous Coal, Atmospheric Fluidized Bed Combustion: Circulating Bed (Bitum. Coal)	
10300221	External Combustion Boilers, Commercial/Industrial, Bituminous/Subbituminous Coal, Pulverized Coal: Wet Bottom (Subbituminous Coal)	
10300222	External Combustion Boilers, Commercial/Industrial, Bituminous/Subbituminous Coal, Pulverized Coal: Dry Bottom (Subbituminous Coal)	
10300223	External Combustion Boilers, Commercial/Industrial, Bituminous/Subbituminous Coal, Cyclone Furnace (Subbituminous Coal)	
10300224	External Combustion Boilers, Commercial/Industrial, Bituminous/Subbituminous Coal, Spreader Stoker (Subbituminous Coal)	
10300225	External Combustion Boilers, Commercial/Industrial, Bituminous/Subbituminous Coal, Traveling Grate (Overfeed) Stoker (Subbituminous Coal)	
10300226	External Combustion Boilers, Commercial/Industrial, Bituminous/Subbituminous Coal, Pulverized Coal: Dry Bottom Tangential (Subbituminous Coal)	
10300305	External Combustion Boilers, Commercial/Industrial, Lignite, Pulverized Coal	
10300306	External Combustion Boilers, Commercial/Industrial, Lignite, Pulverized Coal: Tangential Firing	
10300307	External Combustion Boilers, Commercial/Industrial, Lignite, Traveling Grate (Overfeed) Stoker	
10300309	External Combustion Boilers, Commercial/Industrial, Lignite, Spreader Stoker	
10300401	External Combustion Boilers, Commercial/Industrial, Residual Oil, Grade 6 Oil	
10300402	External Co	10-100 Milltion Btu/hr
10300403	External Co	< 10 Million Btu/hr
10300404	External Combustion Boilers, Commercial/Industrial, Residual Oil, Grade 5 Oil	
10300501	External Combustion Boilers, Commercial/Industrial, Distillate Oil, Grades 1 and 2 Oil	
10300502	External Co	10-100 Milltion Btu/hr
10300503	External Co	< 10 Million Btu/hr
10300504	External Combustion Boilers, Commercial/Industrial, Distillate Oil, Grade 4 Oil	
10300601	External Co	> 100 Million Btu/hr
10300602	External Co	10-100 Milltion Btu/hr
10300603	External Co	< 10 Million Btu/hr
10300701	External Combustion Boilers, Commercial/Industrial, Process Gas, POTW Digester Gas-fired Boiler	
10300799	External Combustion Boilers, Commercial/Industrial, Process Gas, Other Not Classified	

Source Classification Codes (SCCs) for Boilers

SCC Code	Unit Type	Description
10300811		External Combustion Boilers, Commercial/Industrial, Landfill Gas, Landfill Gas
10300901		External Combustion Boilers, Commercial/Industrial, Wood/Bark Waste, Bark-fired Boiler
10300902		External Combustion Boilers, Commercial/Industrial, Wood/Bark Waste, Wood/Bark-fired Boiler
10300903		External Combustion Boilers, Commercial/Industrial, Wood/Bark Waste, Wood-fired Boiler
10301001		External Combustion Boilers, Commercial/Industrial, Liquified Petroleum Gas (LPG), Butane
10301002		External Combustion Boilers, Commercial/Industrial, Liquified Petroleum Gas (LPG), Propane
10301003		External Combustion Boilers, Commercial/Industrial, Liquified Petroleum Gas (LPG), Butane/Propane Mixture: Specify Percent Butane in Comments
10301201		External Combustion Boilers, Commercial/Industrial, Solid Waste, Specify Waste Material in Comments
10301202		External Combustion Boilers, Commercial/Industrial, Solid Waste, Refuse Derived Fuel
10301301		External Combustion Boilers, Commercial/Industrial, Liquid Waste, Specify Waste Material in Comments
10301302		External Combustion Boilers, Commercial/Industrial, Liquid Waste, Waste Oil
10301303		External Combustion Boilers, Commercial/Industrial, Liquid Waste, Sewage Grease Skimmings
30301582		Industrial Processes, Primary Metal Production, Integrated Iron and Steel Manufacturing (See also 3-03-008 & 3-03-009), Miscellaneous Combustion Sources: Boilers
30700104		Industrial Processes, Pulp and Paper and Wood Products, Sulfate (Kraft) Pulping, Recovery Furnace/Direct Contact Evaporator
31000411		Industrial Processes, Oil and Gas Production, Process Heaters, Distillate Oil (No. 2): Steam Generators
31000412		Industrial Processes, Oil and Gas Production, Process Heaters, Residual Oil: Steam Generators
31000413		Industrial Processes, Oil and Gas Production, Process Heaters, Crude Oil: Steam Generators
31000414		Industrial Processes, Oil and Gas Production, Process Heaters, Natural Gas: Steam Generators
31000415		Industrial Processes, Oil and Gas Production, Process Heaters, Process Gas: Steam Generators
10X0001X		Boiler Burning Fuel Oil #2, 3, 4, or Diesel
10X0002X		Boiler Burning Fuel Oil #5, #6, #7
10X0003X		Boiler Burning Natural Gas
10X0004X		Boiler Burning Propane
10X0005X		Boiler Burning Coal
10X0006X		Boiler Burning LPG (liquified petroleum gas)
10X0007X		Boiler Burning Other Fossil Fuel (includes kerosene, gasoline, jet fuel, petroleum)
10X0009X		Boiler Burning Byproduct Gas, Process Gas
10X0014X		Boiler Burning Industrial Solid Waste (unspecified, can include type 0 and 6 wastes)
10X0015X		Boiler Burning Commercial or Industrial Wastes (includes solid/non-solid wastes, can include type 0,1,5, and 6 wastes)
10X0028X		Boiler Burning Sludge (includes papermill sludge, paint/coating sludge, other unidentified sludge)
10X0029X		Boiler Burning Waste Oil
10X0031X		Boiler Burning Uncontaminated Wood
10X0032X		Boiler Burning Contaminated Wood
10X0033X		Boiler Burning Wood (unknown)
10X0034X		Boiler Burning Other (includes institutional, commercial, industrial, etc. facilities burning unspecfied wastes)
10X0035X		Boiler Burning Waste Solvent
10X0036X		Boiler Burning Paper
10X0037X		Boiler Burning Liquid Waste
10X0038X		Boiler Burning Coal Refuse

Source Classification Codes (SCCs) for Boilers

SCC Code	Unit Type	Description
10X0039X	Boiler Burning Coke	
10X0040X	Boiler Burning Oil (unspecified)	
10X0041X	Boiler Burning Fossil Fuel (unspecified)	
10XXXXXX	Boiler Burning Unknown Fuel/Waste	
XXX0001X	Unknown Unit Burning Fuel Oil #2, #3, #4, or Diesel	
XXX0002X	Unknown Unit Burning Fuel Oil #5, #6, or #7	
XXX0003X	Unknown Unit Burning Natural Gas	
XXX0034X	Unknown Unit Burning Other (includes institutional, commercial, industrial, etc. facilties burning unspecified wastes)	
XXXXXX3X	Unknown Unit Burning Natural Gas	
10X0010X	Boiler Burning Pathological Waste (can include type 4 waste)	
10X0012X	Boiler Burning Tires (includes tire-derived fuel (TDF))	
10X0017X	Boiler Burning Bagasse	
10X0018X	Boiler Burning Agricultural Waste Fuels (except bagasse, includes cotton stalks, fruit pits, nut shells, rice hulls, etc)	
10X0019X	Boiler Burning Municipal Solid Waste (general, can include type 0-6 wastes)	
10X0020X	Boiler Burning Residential MSW (includes apartments, nursing homes, prisons)	
10X0021X	Boiler Burning Institutional MSW (includes libraries, churches, schools, national parks, hospitals (non-pathological wastes), dentist offices, etc.)	
10X0024X	Boiler Burning Construction Products (includes gypsum, wallboard, concrete manufacturing wastes)	
10X0030X	Boiler Burning Contaminated Soil	
10X0016X	Boiler Burning Finishing Wastes (Commercial or Industrial wastes from staining, painting, metal coating, other coatings, etc.)	
10X0026X	Boiler Burning Metal Wastes (includes metal product manufacturing wastes and metal reclamation)	
10X0042X	Boiler Burning Unspecified Gas	
10X0044X	Boiler Burning Medical Waste	
10500106	INDUSTRIAL SPACE HEATER; NATURAL GAS	

Appendix B

List of Fuels/Wastes Exempt from the ICR Questionnaire

Appendix B
List of Fuels/Wastes Exempt from the ICR Questionnaire

Completion of a Part II form is not required for boilers, process heaters and incinerators that burn, fire, combust, or destroy **only** the fossil fuels and/or materials listed below. If one or more Part II forms are completed, a Part III form must also be completed.

Fossil Fuels

- butane
- coal (excluding anthracite culm and bituminous gob)
- coke
- distillate oil
- fuel oil
- liquified petroleum gas
- natural gas
- propane

Other Materials

- bagasse
- hazardous waste (as defined under RCRA subtitle C)
- hydrogen
- petrochemical process gas
- petroleum process gas
- pulp mill noncondensible gas
- spent pulping liquors

Appendix C

Manufacturing Consumption of Energy 1994
Table A9 - Total Inputs of Energy for Heat, Power, and Electricity Generation by Fuel Type, Census Region, and End Use: Part 2

(No electronic copy available. Hardcopy's are included in the docket)

Table A9. Total Inputs of Energy for Heat, Power, and Electricity Generation by Fuel Type, Census Region, and End Use, 1994: Part 2

(Estimates in Trillion Btu)

End-Use Categories	Total	Net Electricity[a]	Residual Fuel Oil	Distillate Fuel Oil and Diesel Fuel[b]	Natural Gas[c]	LPG	Coal (excluding Coal Coke and Breeze)	Other[d]	RSE Row Factors
					Total United States				
RSE Column Factors:	NF	0.5	1.3	1.4	0.8	1.2	1.2	NF	
TOTAL INPUTS	18,515	2,858	441	152	6,141	99	1,198	5,828	2.7
Indirect Uses-Boiler Fuel	–	28	313	42	2,398	15	875	–	4.0
Direct Uses-Total Process	–	2,075	106	51	2,872	54	302	–	3.8
Process Heating	–	284	103	29	2,702	49	299	–	4.1
Process Cooling and Refrigeration	–	138	*	*	21	2	*	–	17.5
Machine Drive	–	1,387	3	18	95	3	3	–	7.7
Electro-Chemical Processes	–	271	–	–	–	–	–	–	1.1
Other Process Use	–	15	*	4	53	1	*	–	16.1
Direct Uses-Total Nonprocess	–	457	14	49	726	25	8	–	5.2
Facility Heating, Ventilation, and Air Conditioning[e]	–	217	5	7	351	5	3	–	6.5
Facility Lighting	–	185	–	–	–	–	–	–	1.1
Facility Support	–	46	3	1	30	1	*	–	12.1
Onsite Transportation	–	4	–	35	1	19	–	–	3.9
Conventional Electricity Generation	–	–	5	4	335	1	6	–	8.3
Other Nonprocess Use	–	4	1	2	9	*	0	–	16.9
End Use Not Reported	6,106	96	9	9	148	4	13	5,828	3.8
					Northeast Census Region				
RSE Column Factors:	NF	0.5	1.0	1.2	0.8	1.4	1.4	NF	
TOTAL INPUTS	1,625	321	153	41	517	18	130	446	4.4
Indirect Uses-Boiler Fuel	–	2	119	15	174	2	95	–	8.9
Direct Uses-Total Process	–	236	25	13	250	11	31	–	6.4
Process Heating	–	43	24	9	240	10	31	–	7.8
Process Cooling and Refrigeration	–	16	*	*	1	*	0	–	24.5
Machine Drive	–	151	1	3	8	*	0	–	14.5
Electro-Chemical Processes	–	24	–	–	–	–	–	–	1.3
Other Process Use	–	2	*	*	3	*	0	–	19.1
Direct Uses-Total Nonprocess	–	69	7	11	74	4	*	–	9.1
Facility Heating, Ventilation, and Air Conditioning[e]	–	31	3	5	57	1	*	–	8.1
Facility Lighting	–	29	–	–	–	–	–	–	1.3
Facility Support	–	8	W	*	4	*	0	–	16.5
Onsite Transportation	–	1	–	4	*	3	–	–	5.9
Conventional Electricity Generation	–	–	W	1	12	W	*	–	13.4
Other Nonprocess Use	–	1	1	*	*	W	0	–	30.2
End Use Not Reported	487	14	2	3	18	1	3	446	15.7
					Midwest Census Region				
RSE Column Factors:	NF	0.5	1.3	1.6	0.7	1.2	1.1	NF	
TOTAL INPUTS	4,303	811	75	23	1,635	19	407	1,332	5.2
Indirect Uses-Boiler Fuel	–	8	53	4	517	2	323	–	7.8
Direct Uses-Total Process	–	636	22	7	864	7	77	–	6.7
Process Heating	–	98	W	3	813	6	W	–	8.0
Process Cooling and Refrigeration	–	37	*	*	1	0	*	–	19.5
Machine Drive	–	443	W	2	16	1	W	–	13.4
Electro-Chemical Processes	–	52	–	–	–	–	–	–	1.1
Other Process Use	–	7	*	2	24	*	0	–	18.7
Direct Uses-Total Nonprocess	–	140	W	10	211	9	W	–	8.3
Facility Heating, Ventilation, and Air Conditioning[e]	–	62	W	1	187	2	W	–	12.5
Facility Lighting	–	61	–	–	–	–	–	–	1.2
Facility Support	–	14	*	*	12	*	*	–	16.8
Onsite Transportation	–	2	–	9	*	7	–	–	6.5
Conventional Electricity Generation	–	–	0	*	8	W	W	–	6.6
Other Nonprocess Use	–	2	*	*	3	W	0	–	25.5
End Use Not Reported	1,439	28	W	2	53	1	W	1,332	16.7

See footnotes at end of table.

Table A9. Total Inputs of Energy for Heat, Power, and Electricity Generation by Fuel Type, Census Region, and End Use, 1994: Part 2 (Continued)

(Estimates in Trillion Btu)

End-Use Categories	Total	Net Electricity[a]	Residual Fuel Oil	Distillate Fuel Oil and Diesel Fuel[b]	Natural Gas[c]	LPG	Coal (excluding Coal Coke and Breeze)	Other[d]	RSE Row Factors
South Census Region									
RSE Column Factors:	NF	0.5	1.3	1.5	0.8	1.2	1.2	NF	
TOTAL INPUTS	8,357	1,135	176	56	3,271	28	530	3,164	3.8
Indirect Uses-Boiler Fuel	–	12	121	19	1,419	3	407	–	5.7
Direct Uses-Total Process	–	901	46	19	1,447	13	115	–	5.5
Process Heating	–	106	45	10	1,345	11	W	–	6.4
Process Cooling and Refrigeration	–	68	*	*	17	W	0	–	17.4
Machine Drive	–	810	1	8	64	W	W	–	13.6
Electro-Chemical Processes	–	113	–	–	–	–	–	–	1.2
Other Process Use	–	4	*	*	22	*	*	–	20.8
Direct Uses-Total Nonprocess	–	179	8	15	353	8	5	–	6.6
Facility Heating, Ventilation, and Air Conditioning[e]	–	93	W	1	72	2	2	–	9.9
Facility Lighting	–	66	–	–	–	–	–	–	1.1
Facility Support	–	17	W	*	7	W	0	–	12.6
Onsite Transportation	–	1	–	12	*	6	–	–	4.2
Conventional Electricity Generation	–	–	W	*	269	W	3	–	9.4
Other Nonprocess Use	–	1	*	1	4	*	0	–	22.6
End Use Not Reported	3,269	43	2	3	52	2	4	3,164	15.3
West Census Region									
RSE Column Factors:	NF	0.8	0.9	1.8	0.9	1.1	1.1	NF	
TOTAL INPUTS	2,230	389	36	32	719	37	131	886	4.7
Indirect Uses-Boiler Fuel	–	6	20	5	286	8	50	–	9.8
Direct Uses-Total Process	–	302	12	13	320	24	80	–	6.4
Process Heating	–	36	W	8	305	21	W	–	7.8
Process Cooling and Refrigeration	–	18	0	*	2	W	0	–	12.9
Machine Drive	–	162	W	5	9	W	W	–	9.2
Electro-Chemical Processes	–	83	–	–	–	–	–	–	1.1
Other Process Use	–	3	*	Q	5	*	0	–	27.9
Direct Uses-Total Nonprocess	–	68	W	13	89	4	W	–	8.4
Facility Heating, Ventilation, and Air Conditioning[e]	–	31	W	Q	35	*	W	–	16.9
Facility Lighting	–	29	–	–	–	–	–	–	1.3
Facility Support	–	7	W	*	6	W	0	–	17.2
Onsite Transportation	–	1	–	9	*	3	–	–	5.3
Conventional Electricity Generation	–	–	0	2	45	W	W	–	8.1
Other Nonprocess Use	–	*	0	*	2	W	0	–	23.7
End Use Not Reported	930	13	W	2	24	1	W	886	15.3

[a] "Net Electricity" is obtained by summing purchases, transfers in, and generation from noncombustible renewable resources, minus quantities sold and transferred out. It does not include electricity inputs from onsite cogeneration or generation from combustible fuels because that energy has already been included as generating fuel (for example, coal).

[b] Includes Nos. 1, 2, and 4 fuel oils and Nos. 1, 2, and 4 diesel fuels.

[c] "Natural Gas" includes natural gas obtained from utilities, local distribution companies, and any other supplier(s), such as producers, brokers, and marketers.

[d] "Other" includes net steam (the sum of purchases, generation from renewables, and net transfers) and other energy that respondents indicated was used to produce heat and power.

[e] Excludes steam and hot water.

NF=Not applicable RSE row/column factor.

* Estimate less than 0.5.

W=Withheld to avoid disclosing data for individual establishments.

Q=Withheld because Relative Standard Error is greater than 50 percent.

NA=Not available.

– Estimation of energy input is not applicable.

Notes: • To obtain the RSE percentage for any table cell, multiply the cell's corresponding RSE column and RSE row factors. • Totals may not equal sum of components because of independent rounding. • The estimates presented in this table are for the total consumption of energy for the production of heat and power, regardless of where the energy was produced. Specifically, the estimates include the quantities of energy that were originally produced offsite and purchased by or transferred to the establishment, plus those that were produced onsite from other energy or input materials not classified as energy, or were extracted from captive (onsite) mines or wells. • Allocations to specific end uses are made on the basis of reasonable approximations by respondents.

Source: Energy Information Administration, Office of Energy Markets and End Use, Energy End Use and Integrated Statistics Division, Form EIA-846, "1994 Manufacturing Energy Consumption Survey."